

I. Rejections under 35 U.S.C. § 102(b) over U.S. Application No.: 6,155,664 to Cook (“Cook”).

Claims 1, 3 and 8-10 have been rejected under 35 U.S.C. § 102(b) as being anticipated by Cook.

A. Claim 1

Applicant submits that claim 1 is patentable over the cited reference. For example, claim 1 recites an ink level detector configured to detect at least a low ink state in which quantity of ink stored in a sub-tank is smaller than a predetermined value. Further, an ink consumption counter is configured to acquire the total quantity of ink ejected or discharged by the recording head. When the ink level detector detects the low ink state, and the value acquired by the ink consumption counter reaches a predetermined count value, ink is supplied to the sub-tank by the ink cartridge.

The Examiner maintains that Cook discloses the above features. In particular, the Examiner refers to Fig. 6 and steps 158, 163, 164, 165, 168 and 170 as showing that only in a case where both the ink detector and the counter of Cook indicate low ink levels, the refill operation of step 178 will occur (pg. 9 of the Office Action). Applicant respectfully disagrees for the following reasons.

As disclosed in step 158 of Cook, after the remote ink cartridge 8 and the printhead cartridge 2 have been installed in the printer (step 154), and the printer power is turned on (step 156), the printer controller 36 accesses the printhead cartridge memory device 12 to retrieve the

stored primary ink level value (step 158) (col. 14, lines 35-40). Printer controller 36 also receives the primary ink level value from the ink level sensor 30a-30b (col. 14, lines 40-44).

As stated in the January 30, 2004 Amendment, and set forth in Cook, the printer controller 36 compares the measured primary ink level value to the stored primary ink level value (step 160) (col. 14, lines 44-46). If the ink levels do not match, the printer controller 36 determines that either one or more of the primary ink level sensors 30a-30b have failed, or an inaccurate primary ink level was stored (col. 14, lines 22-59). The printer controller 36 then generates a system fault message indicating that user service is required (step 163). As noted in Cook, at this point, the user does not have enough information to know which ink level is correct, and further diagnosis is required (col. 14, lines 52-59). This comparison is performed for confirmation whether the printer works properly, i.e. to detect a system error, not for determining whether a refill operation is required or not. In particular, no ink is supplied or refilled upon completion of this comparison, as required by the claims.

If the two ink levels above match, the printer controller 36 determines whether the primary drop count value is greater than an amount of ink required to carry out a requested printing task (i.e. the first minimum threshold level (step 164)) (col. 14, lines 60-65). If the amount is in fact greater, the process enters an idle state (step 165) (col. 14, lines 65-67). Then, after printing, the printer controller 36 calculates a new primary drop count value and stores the new value in the printhead cartridge memory device 12, at step 168 (col. 15, lines 1-7).

On pg. 9 of the Office Action, the Examiner maintains that if “both the counter and the detector indicate a non-low ink level the operation proceeds to step 165.” However, as discussed

above, the sensors 30a-30b are not a factor in step 164 for determining whether the process can enter an idle state, i.e., step 165. Rather, it is the primary drop count value and a first minimum threshold level of ink that are compared.

On the other hand, if back at step 164, the primary drop count value is less than the first minimum threshold level of ink to carry out a requested printing task, the printer controller 36 accesses the remote ink cartridge memory device 14, and retrieves the secondary drop count value (step 170) (col. 15, lines 15-20). The printer controller 36 also retrieves a measured secondary ink level value from the secondary ink level sensors 28a-28e (col. 15, lines 20-24). As shown in Fig. 1, the sensors 28a-28e are provided on the secondary reservoir 10. Therefore, contrary to the Examiner's assertion on pg. 9 of the Office Action, the process does not proceed to step 170 if the counter and the detector indicate a low ink level. Rather, as set forth above, the process proceeds to step 170 if the primary drop count value is less than the first minimum threshold level of ink to carry out a printing task.

Further, the information from the secondary ink drop count value and the secondary ink level sensors are retrieved for the same reasons as set forth above in step 158, i.e. the values are compared to see if they match (step 172) (col. 15, lines 24-26). If the two values do not match then the secondary sensors 28a-28e have failed or an inaccurate secondary ink level value was stored, and at this point, the user does not have enough information to know which level is correct, and service is required (steps 174, 175) (col. 15, lines 30-39). Similar to Applicant's statements above, there is no ink supplied or refilled upon completion of this comparison, as required by the claims.

If the two levels are determined to match, the printer controller 36 compares the secondary drop count value to a second minimum threshold level of ink required to carry out a printing task (step 176) (col. 15, lines 40-43). If the secondary drop count value is less than the second minimum threshold level, the printing operation is stopped and the user is notified to replace the remote ink cartridge 8 (step 177) (col. 15, lines 43-47). If the secondary drop count value is greater than the second minimum threshold value, the printer controller 36 sends an enable flow signal to the flow control device 5, and ink is transferred from the secondary ink reservoir 10 to the primary ink reservoir 4 (step 178) (col. 15, lines 47-52).

As shown above, the actual transfer of ink is based upon the drop count values and the minimum threshold values, where the threshold value is an amount of ink required to carry out a printing task. Thus, the actual transfer of ink is not based on the ink level sensors, as set forth by the Examiner on pg. 9 of the Office Action. Rather, as set forth above, the sensors 28a-28e or 30a-30b, are used to determine if a faulty message should be sent to the user.

As set forth in the January 30, 2004 Amendment, the sensors 30a-30b provide a function in addition to indicating that print controller 36 needs to generate a system fault message. For example, as explicitly stated in Cook, "during the ink transfer", the printer controller 36 receives the measured primary ink level value from the sensing circuit 32 (i.e. the sensors 30a-30b) (step 180) (col. 15, lines 53-56). The measured primary ink level value of sensors 30a-30b is used to determine whether the ink reservoir 4 is full or not yet full (steps 182, 184) (col. 15, lines 56-62). In other words, the printer controller 36 refers to the values of the ink level sensors 30a-30b,

after a supply of ink has already begun. Therefore, the ink level sensors 30a-30b are not used as a condition to commence the supply of ink in an ink refill operation.

Accordingly, Applicant submits that Cook fails to disclose that, when the ink level detector detects the low ink state and the value acquired by the ink consumption counter reaches a predetermined value, ink is supplied to the sub-tank by the ink cartridge, as recited in the claims.

Based on the foregoing, Applicant submits that claim 1 is patentable over the cited reference.

B. Claim 3

Since claim 3 is dependent upon claim 1, Applicant submits that such claim is patentable at least by virtue of its dependency.

C. Claim 8

Since claim 8 recites a method utilizing features which are analogous to the features recited in claim 1, Applicant submits that claim 8 is patentable for at least analogous reasons as presented above.

D. Claims 9 and 10

Since claims 9 and 10 are dependent upon claim 8, Applicant submits that such claims are patentable at least by virtue of their dependency.

II. Rejection under 35 U.S.C. § 103(a) over Cook in view of EP 841 173 to Kobayashi et al. (“Kobayashi”).

Claims 2 and 7 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over Cook in view of Kobayashi. However, since claims 2 and 7 depend upon claim 1, and Kobayashi fails to cure the deficient teachings of Cook, Applicant submits that claims 2 and 7 are patentable at least by virtue of their dependency.

III. Rejection under 35 U.S.C. § 103(a) over Cook in view of U.S. Patent No. 4,432,005 to Duffield et al. (“Duffield”).

Claim 4 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Cook in view of Duffield. However, since claim 4 depends upon claim 1, and Duffield fails to cure the deficient teachings of Cook, Applicant submits that claim 4 is patentable at least by virtue of its dependency.

IV. Rejection under 35 U.S.C. § 103(a) over Cook in view of U.S. Patent No. 4,466,284 to Dumery (“Dumery”).

Claim 6 has been rejected under 35 U.S.C. § 103(a) as being unpatentable over Cook in view of Dumery. However, since claim 6 is dependent upon claim 1, and Dumery fails to cure the deficient teachings of Cook, Applicant submits that claim 6 is patentable at least by virtue of its dependency.

V. Allowable Subject Matter

As stated above, the Examiner has indicated that claim 5 is allowed, and claim 11 contains allowable subject matter.

VI. Conclusion

In view of the above, reconsideration and allowance of this application are now believed to be in order, and such actions are hereby solicited. If any points remain in issue which the Examiner feels may be best resolved through a personal or telephone interview, the Examiner is kindly requested to contact the undersigned at the telephone number listed below.

Response under 37 C.F.R. § 1.116
U.S. Patent No. 10/024,643

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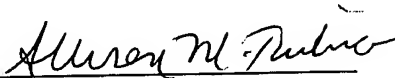
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